

REMARKS

Favorable reconsideration is respectfully requested in view of the foregoing amendments and following remarks.

I. CLAIM STATUS AND AMENDMENTS

Claims 9-14 were pending in this application when last examined and stand rejected.

Claims 9-14 have been cancelled without prejudice or disclaimer thereto. Applicants reserve the right to file a continuation or a divisional on any cancelled subject matter.

New claims 17-26 have been added.

Support for "introducing a reaction gas into a collection column at a temperature of 140 to 250°C" in claim 17 can be found in the disclosure, for example, at page 8, lines 21-25.

Support for "introducing an aqueous medium into the collection column at a temperature of 20 to 50°C" in claim 17 can be found in the disclosure, for example, at page 9, lines 21-23.

Support for "causing the acrylic acid aqueous solution to flow out from the bottom of the collection column" in claim 17 can be found in the disclosure, for example, at page 7, lines 16-20.

Support for "causing the reaction gas remaining after the collection step to flow out from the top of the collection column" in claim 17 can be found in the disclosure, for example, at page 14, lines 5-7.

Support for "0.8<(B/A)" in claim 17 can be found in the disclosure, for example, at page 8, lines 5-6.

Support for "performing heat removal in the collection column using a heat-removing device on the collection column to maintain the following condition: 0.8<(B/A)<1.25" in claim 17 can be found in the disclosure, for example, at page 7, lines 3-23, and at page 10, lines 11-19.

New claim 18 corresponds to the previous claim 10 (now cancelled).

Support for "the temperature at the top of the collection column is 72°C or less, and the temperature at the bottom of the collection column is 86°C or less" in claim 17 can be found in the disclosure, for example, at page 8, lines 7-11.

Support for "a water content in the aqueous medium introduced into the collection column is 0.5- to 2-fold of a water content in the reaction gas introduced into the collection column" in claim 20 can be found in the disclosure, for example, at page 9, lines 23-25.

Support for "a degree of fluctuation of the temperature at the top of the collection column is within 2°C in steady operation conditions" in claim 21 and "the temperature at the top of the collection column is kept within $\pm 1^{\circ}\text{C}$ of a temperature in steady operation conditions" in claim 22 can be found in the disclosure, for example, at page 10, lines 15-9, respectively.

Support for " $(\text{B}/\text{A}) \leq 1.15$ " in claim 26 is based on the B/A in Examples 1 to 5, which are in the range of 1.06 to 1.15 in Table 1 of the specification.

Therefore, no new matter has been added by this amendment.

Claims 17-26 are pending upon entry of this amendment.

II. OBJECTION TO THE SPECIFICATION

On page 2 of the Action, the specification was objected to on the basis that the recitations of claim 9 are not positively recited in the disclosure.

The present amendment cancels claim 9, thereby obviating this rejection.

III. INDEFINITENESS REJECTION

On page 2, claims 12 and 14 were rejected under 35 U.S.C. § 112, second paragraph, on the basis that the recitation "the temperature at the top of the column is kept within $\pm 1^{\circ}\text{C}$ " in claims 12 and 14 is ambiguous and confusing.

Claims 12 and 14 have been cancelled.

This rejection is respectfully traversed as applied to the new claims. Support for "the temperature at the top of the collection column is kept within $\pm 1^{\circ}\text{C}$ of a temperature in steady operation conditions" in new claim 22 can be found in the disclosure, for example, at page 10, lines 15-9. Based on this disclosure, it is respectfully submitted that one skilled in the art would understand the metes and bounds of this claim language.

Therefore, the rejection of claims 12 and 14 under 35 U.S.C. § 112, second paragraph, is untenable and should not be applied to the new claims.

IV. OBVIOUSNESS REJECTION

On page 2, claims 9-11 and 13 were rejected under 35 U.S.C. § 103(a) as obvious over EP 0778255.

This rejection is respectfully traversed as applied to the new claims.

To establish obviousness, three criteria must be met. First, the prior art references must teach or suggest each and every element of the claimed invention. M.P.E.P. § 2143.03. Second, there must be some suggestion or motivation in the references to either modify or combine the reference teachings to arrive at the claimed invention. M.P.E.P. § 2143.01. Third, the prior art must provide a reasonable expectation of success. M.P.E.P. § 2143.02.

The present invention is directed to a method for collecting acrylic acid in a reaction gas by making an aqueous medium absorb acrylic acid in a reaction gas in a collection column. The method comprises performing heat removal in the collection column by using a heat-removing device added to the collection column to control B/A, which is a ratio A to B in the specified range, wherein A represents a weight fraction of acrylic acid to all condensable ingredients in the reaction gas before collecting acrylic acid and B represents a weight fraction of acrylic acid in the bottom of the collection column.

According to the present invention, as described at page 20, lines 11 to 15 of the disclosure, the concentration of acrylic acid remaining in the reaction gas can be reduced, and acrylic acid can be collected from the reaction gas efficiently.

Such effects of the present invention are supported by the Examples in the disclosure.

For instance, Example 1 (on pages 11-14) discloses that a heat exchanger for cooling a circulation liquid is provided at the collection column, and it was operated by adjusting the load of the heat exchanger such that the temperature of the top of the collection column reached 60°C.

Further, in Example 2 and Comparative Example 1 (on pages 14-16), acrylic acid was collected under the same conditions as Example 1, except the temperature at the top of the collection column was set at X°C. In other words, Example 2 and Comparative Example 1 are examples in which the load of the heat exchanger was changed against Example 1.

The temperature at the top of the collection column, B/A, and loss of acrylic acid from the top of the collection column are shown in the following Table 1.

Table 1

	Column Top Temperature (°C)	B/A (-)	Loss of Acrylic Acid from Column Top (%)
Example 1	60	1.06	0.4
Example 2	63.5	1.15	1.9
Comparative Example 1	66.5	1.26	5.4

Regarding B/A and the loss of acrylic acid, the loss in Example 2 is larger than that in Example 1, and the loss in Comparative Example 1 is much larger than that in Example 2. These results mean that: in Example 2 and Comparative Example 1, the temperature at the top of the

collection column increases due to the amount of heat removed as compared with Example 1. Therefore, B/A is larger, and the amount of the loss of acrylic acid from the top of the collection column increases.

On the other hand, EP 0778225 (EP '255) neither discloses or suggests any of the following features of the claimed invention: (1) a collection column with a heat-removing device attached thereto; and (2) controlling the amount of heat removed in the collection column so that B/A meets the condition $0.8 < B/A < 1.25$.

It is respectfully submitted that the present invention is not obvious to a person skilled in the art based on the disclosure in EP' 255, which does not teach any means for controlling the amount of heat removed in the collection column. Nor does EP' 255 disclose or suggest the specified range of B/A and the control of B/A by means of heat removal in the collection column. Thus, EP' 255 fails to disclose or suggest each and every element of the claimed invention. For this reason the reference cannot render obvious the claimed invention.

Therefore, the rejection of claims 9-11 and 13 under 35 U.S.C. § 103(a) is untenable and should be withdrawn.

Attorney Docket No. 2004_0589A
Serial No. 10/828,340
July 14, 2006

CONCLUSION

In view of the foregoing amendments and remarks, it is respectfully submitted that the present application is in condition for allowance and early notice to that effect is hereby requested.

If the Examiner has any comments or proposals for expediting prosecution, please contact the undersigned attorney at the telephone number below.

Respectfully submitted,

Shuhei YADA et al.

By:



Jay F. Williams

Registration No. 48,036
Attorney for Applicants

JFW/dlk/akl
Washington, D.C. 20006-1021
Telephone (202) 721-8200
Facsimile (202) 721-8250
July 14, 2006